Letters to the Editor

The extrapleural fat sign

To the Editor:

We read with great interest the communication on extrapleural hematoma by Dr Kabiri and colleagues in the August 2006 issue.[1] We would like to contribute to the diagnosis value of this report with the explanation of the pathognomonic radiologic sign they mentioned, known as the "extrapleural fat sign." We report a similar case demonstrating this sign.

A 61-year-old man with shortness of breath and thoracic pain with respiratory movements after a blunt trauma was admitted to our institution. Initial x-ray evaluation showed diffuse increased density in the left hemithorax with 5th to 10th posterior rib fractures. The diagnosis was multiple left rib fractures associated with ipsilateral hemothorax. A pleural tube was seemingly successfully placed as hematic fluid was drained. The initial hemogram and vital signs were within normal limits. During the next 4 days, the patient's systolic blood pressure, hemoglobin, and hematocrit levels decreased, and a decreased quantity of serosanguinolent fluid was obtained by the pleural drainage. The lack of abdom-

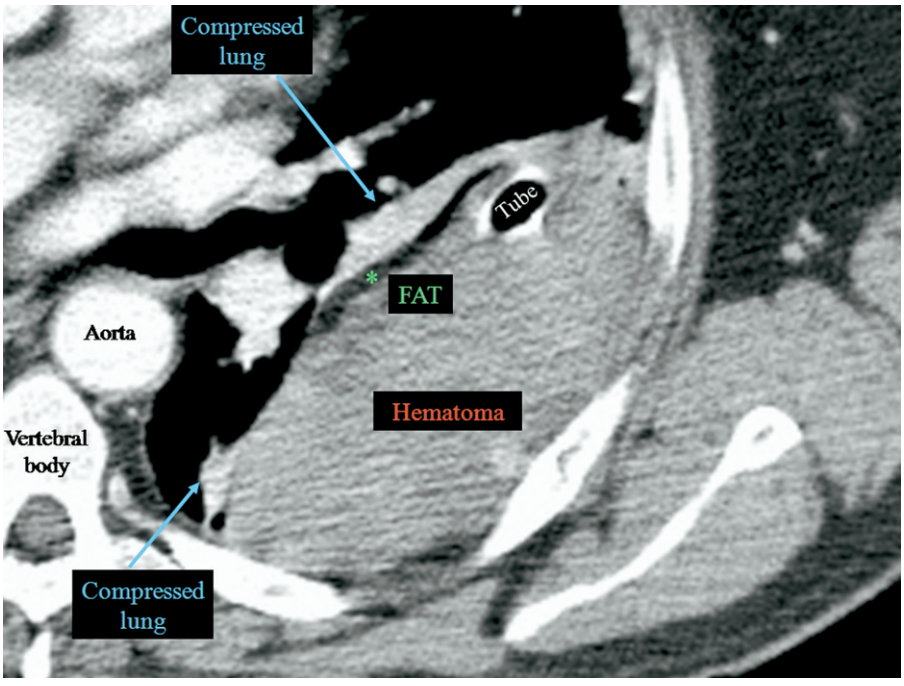

Figure 1. Contrast-enhanced axial CT image demonstrates a large collection of increased attenuation, interpreted as a hematoma, that contains the chest tube separated from the enhancing partially collapsed left lower lobe by a fat attenuation stripe. This fat ribbon is known as the extrapleural fat sign and establishes the extrapleural location of the lesion.

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inal symptoms and normal ultrasound ruled out abdominal traumatic lesions. Chest x-ray follow-up showed radiologic findings that were suggestive of extraparenchymatous lesion, either pleural or extrapleural. Thorax computed tomography (CT) was ordered to assess for loculated pleural hemothorax versus extrapleural location, because plain x-rays cannot differentiate between these locations. Contrast-enhanced CT images (Figure 1) revealed a large collection of increased attenuation, which contained the chest tube, separated from the enhanced, partially collapsed left lower lobe by a fat attenuation stripe. The large outer high-density collection was interpreted as an extrapleural hematoma, which was separated from the lower lobe atelectasis by the parietal pleura and extrapleural fat. The patient underwent an open thoracotomy, and a large extrapleural hematoma was found and removed.

The extrapleural fat sign[2] refers to the fat layer outside the pleura in the chest wall between the parietal pleura and the endothoracic fascia. Recognition of this finding on CT scan is useful to determine the extrapleural location of a lesion, as it is outlined by a fat ribbon that represents the extrapleural fat medially displaced.[3] In our case, the extrapleural fat sign was useful in distinguishing an extrapleural hematoma from the initially diagnosed pleural hemothorax. Extrapleural hematomas are rare and known to occur as a result of blunt trauma or placement of medical devices. When the hematoma is traumatic, it can be associated with rib fracture, hemothorax, lung contusion, or pneumothorax.[4] A formal or minithoracotomy is the recommended procedure in cases of large hematomas or unstable patients.[5] This sign has also been described secondary to thoracic wall tumor and edema.

Plain x-ray semiology suggests the extraparenchymatous location of the lesion. It is the recognition of medially displaced extrapleural fat on CT that helps to establish a differential diagnosis on the basis of an extrapleural lesion.

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References

1. Kabiri EH, Arsalane A, Zidane A, Aoini F. Extrapleural hematoma as a complication of spontaneous pneumothorax. *J Thorac Cardiovasc Surg.* 2006;132:423-4.
2. Hammerman AM, Susman N, Strzembosz A. Kaiser LR. The extrapleural fat sign: CT characteristics. *J Comput Assist Tomogr.* 1990;14:345-7.
3. Aquino SL, Chiles C, Oaks T. Displaced extrapleural fat as revealed by CT scanning: evidence of extrapleural hematoma. *AJR Am J Roentgenol.* 1997;169:687-9.
4. Goh BK, Koong HN. Massive traumatic extrapleural hematoma mimicking hemothorax: a potential pitfall of penetrating chest trauma. *J Trauma.* 2006;61:995-7.
5. Poyraz AS, Kilic D, Gultekin B, Ozulku M, Hatipglu A. Extrapleural hematoma: when is surgery indicated? *Monaldi Arch Chest Dis.* 2005;63:166-9.

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Cutting secondary chordae and placing dual taut stitches between the anterior mitral fibrous annulus and the heads of each papillary muscle to treat ischemic mitral regurgitation without deteriorating left ventricular function

To the Editor:

Langer and associates[1] are to be congratulated for their novel work in repositioning the posterior papillary muscle (PPM) using Teflon-pledgeted 4-0 polytetrafluoroethylene (PTFE) suture (in their term, "STRING") sewn up to the midseptal fibrous annulus to treat ischemic mitral regurgitation (IMR) by shortening the distance between the PPM head and the mitral annulus, thus reducing the tenting height and enhancing the coaptation zone. We investigated the effects of cutting secondary chordae of the anterior leaflet and putting dual stitches with different tensions between the middle portion of the anterior mitral annulus and the head of both papillary muscles in a canine failing heart model (Figure 1).[2] Although Langer and colleagues reported that the STRING procedure clinically treated IMR better than an undersized annuloplasty ring alone in 12 patients, several concerns should be raised in its clinical application according to the findings from our animal study.

First, Langer and colleagues[1] did not perform chordal cutting, which has been shown to be effective in eliminating the anterior leaflet bend, reducing tenting height, and decreasing the extent of mitral regurgitation without prolapse.[3] This simple technique can be performed easily and concomitantly with the STRING procedure.

Second, Langer and colleagues[1] did not put PTFE stitches on the head of the anterior papillary muscle. To decrease tenting height, Langer and associates pulled only the PPM head toward the midseptal fibrous annulus because papillary muscle displacement is usually found in PPM and not in the anterior papillary muscle.[1] However, tenting is usually observed in both the medial and lateral sides of the anterior leaflet in patients with IMR,[4] which may necessitate the creation of new tension in both the anterior papillary muscle and the PPM to reduce tenting of the entire anterior leaflet.

Third, the appropriate tension of newly constructed PTFE should be defined. Langer and associates[1] pulled STRING with intraoperative echocardiographic guidance to the extent that residual mitral regurgitation significantly improved from the state with undersized mitral annuloplasty and no tension on STRING. IMR is a ventricular disease rather than a valvular disease. IMR is the